

Appl. No. 09/843,002
Amdt. Dated September 26, 2003
Reply to Office Action of June 27, 2003

Attorney Docket No. 81870.0018

REMARKS/ARGUMENTS:

Minor changes are made to this specification. Claims 1, 3, 4, 9, 11, 12, 17, and 19 are amended. Claims 1-19 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

The present invention relates to a carrier for optical semiconductor device and a mounting structure thereof used in optical fiber communication system or optical local area network, and further relates to an optical semiconductor module on which optical wave guide elements such as the carrier for optical semiconductor device, an optical fiber coupled thereto and an optical wave guide channel are mounted. (Applicant's specification, at p. 1, lines 5-11).

TITLE OF THE INVENTION IS NOT DESCRIPTIVE:

The title of the objection is objected to because the Office contends that the title of the invention is not descriptive. The Office is requiring a new title that is clearly indicative of the invention to which the claims are directed. Applicant respectfully disagrees that the title is not descriptive. However, Applicant has rewritten the title in order to avoid delays in prosecution of the instant application. Specifically, the new title is as follows: OPTICAL MODULE AND CARRIER FOR OPTICAL MODULE. Withdrawal of the objection is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 112:

Claims 1-19 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office states, "The term 'optical semiconductor device', 'a device mounting face' in claim 1 is used by the claim to mean, 'having a mounting face',

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while the accepted meaning is 'a mounting structure.' The term is indefinite because the specification does not clearly redefine the term." The Office further states, "Although, it may define in the body of the specification it is noted that the claim language as it claimed throughout the claims are not clear. Thus, it fails to give a proper understanding to the claim how & what formed and where, what and how mounting face corresponds." Applicant respectfully traverses this rejection.

In response, the Applicant respectfully submits that the term "device mounting face" as used in claim 1 is clear. Claim 1, as amended, is as follows:

A carrier for optical semiconductor device having a device mounting face on which at least one optical semiconductor device is to be mounted and at least one positioning face slanted by a predetermined angle with respect to the device mounting face and disposed below a position at which the optical semiconductor device is mounted, wherein the device mounting face connects to the positioning face.

The "device mounting face," according to claim 1, is the face upon which the "optical semiconductor device" is to be mounted. The device mounting face is read on the front face 251 (although not limited thereto), on which the optical semiconductor device 230 is to be mounted. (Applicant's specification, at p. 25, lines 18-24; Figure 7). In view of the foregoing, Applicant believes that term "device mounting structure" is clearly defined. Withdrawal of this rejection is thus respectfully requested.

The Office states, "The recitation of claim 3, lines 2-3, which will be used for positioning the carrier on another substrate is formed on the positioning face. It fails to give understanding to the claim how many substrate applicant is referring to." In response, the phrase "another substrate" has been replaced with the phrase --a

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substrate--. Accordingly, the Applicant is referring to a single substrate. Withdrawal of this rejection is thus respectfully requested.

The Office states, "In claim 4, the recitations ----- 'the device mounting face corresponds to surface or surface of a single crystalline silicon and the positioning face corresponds to surface equivalent to surface of the single crystalline silicon' This type of claim language is vague and indefinite because it fails to give understanding to the claim what surface or surface equivalent surface exactly applicant is referring to. Thus this type of claim language in any claim is vague and indefinite."

In response, the Applicant amended claim 4 to clarify what surfaces and surface equivalents are being referred to. Claim 4, as amended, is as follows:

The carrier in accordance with claim 1, wherein the device mounting face corresponds to {110} surface equivalent to (110) surface or {100} surface equivalent to (100) surface of a single crystalline silicon and the positioning face corresponds to {111} surface equivalent to (111) surface of the single crystalline silicon.

According to claim 4, the device mounting face corresponds to any surface that is equivalent to either the (110) surface or the (100) surface. The positioning face corresponds to any surface that is equivalent to the (111) surface. The numbers in parentheses represent Miller indices, which represent specific faces/surfaces in a lattice. The numbers in brackets represent all faces/surfaces in a lattice that are equivalent to a specific face/surface. The parenthesis/bracket nomenclature is well known to a person of ordinary skill in the art. In view of the foregoing, Applicant believes that the language in amended claim 4 is clear and definite. Withdrawal of this rejection is thus respectfully requested.

The Office states, "The recitation of claim 12, line 2 ----- 'having the above-mentioned configurations' is vague and indefinite." In response, the Applicant

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deleted the phrase "having the above mentioned configurations" from claim 12. Withdrawal of this rejection is thus respectfully requested.

The Office states, "Note the above informalities are representative of all of the informalities present in the claims. Applicant should correct all of the informalities present in the claims." In response, the Applicant amended claims 9 and 17 in a manner similar to claim 4, discussed above. Applicant believes all informalities have been corrected. Withdrawal of any remaining rejections is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 102:

Claims 1-3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Melhorn et al. (U.S. Patent No. 6,285,808). The Applicant respectfully traverses the rejection. Claim 1, as amended, is as follows:

A carrier for optical semiconductor device having a device mounting face on which at least one optical semiconductor device is to be mounted and at least one positioning face slanted by a predetermined angle with respect to the device mounting face and disposed below a position at which the optical semiconductor device is mounted, wherein the device mounting face connects to the positioning face.

Applicant respectfully submits that Melhorn cannot anticipate claim 1 because Melhorn fails to teach a device mounting face that connects to the positioning face. Melhorn is directed to circuit carrier, comprising several layers of at least one insulating material and conductor structures located on or in the layers, at least one optical layer having two sides; other layers in which both of the sides of the at least one optical layer are embedded; at least one surface-mountable electro-optical component disposed at least at one of the sides, the electro-optical optical component disposed at least at one of the sides, the electro-optical

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component having at least one optical connection and electrical connections; a surface of the circuit carrier having a bore formed therein extending at least to within the at least one optical layer; and an optical deflecting system disposed in the vicinity or region of the at least one optical layer. (Melhorn, column 1, lines 51-63).

In Melhorn, an electro-optical component 4 is attached, e.g. through soldering, to the surface of the circuit board layer 2 through the use of electrical connections 5 with the conductor structure L2. (Melhorn, column 3, lines 51-63; Figures 1-2). The light emitted from the optoelectronic component 4 travels in a beam vertically downwards through the stub 7 and is deflected in the optical deflecting system 9 by 90° so that it enters the optical layer 1, in this case horizontally. (Melhorn, column 3, lines 56-60; Figures 1-2). Thus, the deflecting system face 9 is not connected to the face on which the optoelectronic component 4 is to be mounted.

In light of the foregoing, Applicant respectfully submits that Melhorn could not have anticipated or rendered obvious claim 1, because Melhorn fails to teach or suggest each and every claim limitation. Claims 2, 3, and 5 depend from claim 1 and cannot be anticipated or rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

Claims 1-3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Moisel (U.S. Patent No. 6,236,788). The Applicant respectfully traverses the rejection.

Applicant respectfully submits that Moisel cannot anticipate claim 1 because Moisel fails to teach i) a device mounting face and ii) a device mounting face that connects to a slanted positioning face. Moisel is directed to an arrangement which permits a simple and extremely precise alignment of optical components relative to each other. (Moisel, column 1, lines 48-50). In Moisel, the optical component 5 is

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held in place precisely inside a recess 23. (Moisel, column 3, lines 1-3). Therefore, the optical component is in a recess and not mounted on a surface. Thus, in Moisel there is no teaching or suggestion of a device mounting face much less of a device mounting face that connects to a slanted positioning face.

In light of the foregoing, Applicant respectfully submits that Moisel could not have anticipated or rendered obvious claim 1, because Moisel fails to teach or suggest each and every claim limitation. Claims 2, 3, and 5 depend from claim 1 and cannot be anticipated or rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

Claims 1-3 and 5 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Setoguchi (U.S. Patent No. 6,467,972). The Applicant respectfully traverses the rejection.

Applicant respectfully submits that Setoguchi cannot anticipate claim 1 because Setoguchi fails to teach i) at least one positioning face slanted by a predetermined angle and ii) a device mounting face that connects to a slanted positioning face. Setoguchi is directed to an optical interconnection module and a mounting structure thereof by which an optical fiber and an optical semiconductor device can precisely be interconnected to realize a reliable interconnection in a long term. (Setoguchi, column 4, line 66-column 5, line 3).

The Office states, "Figure 7 describes the instant invention as claimed in claim 1-3 and 5." However, an inspection of Figure 7 reveals no slanted positioning face much less a slanted positioning face that is connected to a device mounting face. Furthermore, Setoguchi's specification fails to teach or suggest either that the base member 119 has a slanted position face, or that the face on which the photodiode 111 is mounted is connected to a slanted positioning face. (Setoguchi, column 9, line 50-column 10, line 64: Figure 7).

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In light of the foregoing, Applicant respectfully submits that Setoguchi could not have anticipated or rendered obvious claim 1, because Setoguchi fails to teach or suggest each and every claim limitation. Claims 2, 3, and 5 depend from claim 1 and cannot be anticipated or rendered obvious for at least the same reasons as claim 1. Withdrawal of these rejections is thus respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 4, 6-10, and 12-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Setoguchi (U.S. Patent No. 6,467,972). The outstanding Office lists claims 4, 6-10, and 12-18 being rejected over "Goodman (U.S. Patent No. 4,963,906)". Applicant believes this is a typographical error, since all of the Office's comments are based upon Setoguchi (U.S. Patent No. 6,467,972). Applicant also notes that the Office's FIG. 3 which occurs directly below the rejection is from Moisel (U.S. Patent No. 6,236,788). However, no reference was made to Moisel or this figure in the Office's rejection. Consequently, the Applicant will proceed as though Setoguchi is the only reference being relied upon. Applicant respectfully traverses these rejections.

Claim 4 depends from claim 1, and as such includes all the limitations of amended claim 1, and therefore cannot be rendered obvious over Setoguchi for at least the same reasons as discussed above. Withdrawal of this rejection is thus respectfully requested.

Claim 6 is as follows:

A mounting structure of an optical semiconductor device comprising a carrier on which at least one optical semiconductor device is mounted and a substrate on which the carrier with the optical semiconductor device and another optical device are mounted, wherein

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the carrier has a device mounting face on which at least one optical semiconductor device is to be mounted and at least one first positioning face slanted by a first predetermined angle with respect to the device mounting face and disposed below a position at which the optical semiconductor device is mounted; and

the substrate has at least one second positioning face slanted by a second predetermined angle with respect to a top face of the substrate to which the positioning face of the carrier is contacted.

Applicant respectfully submits that Setoguchi cannot render claim 6 obvious because Setoguchi fails to teach or suggest i) a carrier with at least one positioning face slanted and ii) a substrate that has at least one second positioning face slanted by a second predetermined angle with respect to a top face of the substrate to which the positioning face of the carrier is contacted. As discussed above, the base member 119 (carrier) in Figure 7 does not have any slanted faces. Furthermore, there is no indication of a slanted face in the mounting base member (substrate) 103 to which the positioning face of the carrier is contacted. (Setoguchi, column 9, line 50-column 13, line 24; Figure 7).

In light of the foregoing, Applicant respectfully submits that Setoguchi could not have made claim 6 obvious, because Setoguchi fails to teach or suggest each and every claim limitation. Claims 7-10 depend from claim 6 and cannot be made obvious for at least the same reasons as claim 6. Withdrawal of these rejections is thus respectfully requested.

Claim 12, as amended, is as follows:

An optical module comprising a carrier, a substrate, at least one optical semiconductor device mounted on the carrier and at least one optical fiber mounted on the substrate so as to be optically coupled with the optical semiconductor device, wherein

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the carrier has a device mounting face on which the optical semiconductor device is to be mounted and at least one first positioning face slanted by a first predetermined angle with respect to the device mounting face and disposed below a position at which the optical semiconductor device is mounted; and

the substrate has at least one second positioning face slanted by a second predetermined angle with respect to a top face of the substrate to which the positioning face of the carrier is contacted and at least one positioning groove in which the optical fiber is mounted in a manner so that an end face of the optical fiber face a functional face of the optical semiconductor device.

Applicant respectfully submits that Setoguchi cannot render claim 12 obvious for reasons similar to those given for claim 6. Claim 12 requires i) a carrier with at least one positioning face slanted and ii) a substrate that has at least one second positioning face slanted by a second predetermined angle with respect to a top face of the substrate to which the positioning face of the carrier is contacted. Neither one of these limitations is taught or suggested by Setoguchi.

In light of the foregoing, Applicant respectfully submits that Setoguchi could not have made claim 12 obvious, because Setoguchi fails to teach or suggest each and every claim limitation. Claims 13-18 depend from claim 12 and cannot be made obvious for at least the same reasons as claim 12. Withdrawal of these rejections is thus respectfully requested.

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ALLOWABLE SUBJECT MATTER:

The Office states, "Claims 11 and 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office's action and to include all of the limitations of the base claim and any intervening claims." In response, the Applicant amended claims 11 and 19 to overcome rejections under 35 U.S.C. § 112 and to include all of the limitations of the base claim and any intervening claims. Withdrawal of these rejections and allowance of claims 11 and 19 is thus respectfully requested.

The art made of record but not relied upon by the Examiner has been considered. However, it is submitted that this art neither describes nor suggests the presently claimed invention.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6810 to discuss the steps necessary for placing the application in condition for allowance.

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If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

HOGAN & HARTSON L.L.P.

By: Lawrence J. McClure

Lawrence J. McClure
Registration No. 44,228
Attorney for Applicant(s)

Date: September 26, 2003

500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
Phone: 213-337-6700
Fax: 213-337-6701

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